COPYRIGHT 1984

ⓘ

BYTE-BACK CO.

UM-64 MEMORY MANUAL

Your new BYTE-BACK UM-64 memory module employs the latest technology in memory design. The UM-64 design provides the expansion port on the back that allows you to expand the use of your computer and connect a printer or other module at the same time you are using your UM-64.

The UM-64 wired and tested unit comes to you fully tested. Our extensive memory tests ensure that every single memory location is operating correctly.

BASIC OPERATION

NEVER CONNECT OR DISCONNECT YOUR COMPUTER WHEN POWER IS APPLIED. Remember, keeping the video cable and power cable away from each other will give you a better display. There are two rocker switches on the left side of your computer. The bottom switch must be in the "up" position before powering up the computer.

With power disconnected, plug the UM-64 into the computer. Make sure it is plugged in all the way. Connect the power and watch the screen. You can tell your UM-64 is working if it takes four or five seconds for the cursor to appear. Without the UM-64, the cursor will appear almost immediately. This delay with the UM-64 is a feature of the ROM. There is a program in the ROM to do a brief test of the system memory when power is first turned on. It doesn't take long to test 1K of memory, but with more memory it takes longer.

The ROM only checks the first 16K of memory and in fact, the computer doesn't even know that more memory is available until you tell it. The upper limit of memory is called RAMTOP. To change it to 64K enter the following.

POKE 16389,255	This changes RAMTOP which tells the computer how much memory is available.
NEW	This initializes the computer for the new limit.

(Refer to chapter 25/26 of the computer handbook if you want to set RAMTOP lower.)

Now the computer automatically puts instructions in the 16K to 32K area and puts arrays and variables in the 32K to 64K area. The arrays and variables start at the top and move down and will automatically go into the lower 16K when the top 32K is full. The instructions automatically go into the lower part of the 16K to 32K area and move towards the 32K point in the memory as more instructions are added. Your UM-64 will load programs which contain more than 16K of BASIC and it will allow you to create your own extensive programs which require more than 16K of BASIC.

The UM-64 contains a full 64K of RAM memory. The 0-8K area of ROM from the computer can be transferred into the 0-8K of RAM thus allowing the user to alter the computers ROM to suit his own needs. The user cannot, however, alter the character generator. The 8-16K area is available for machine code programs and can be reached by peeks and pokes. The remaining 48K is used for Basic programing and variable storage. The 8-16K area may be disabled for using proms or for memory mapped input/output. This inable/disable options is controlled in 2K increments by switches 1 thru 4 on the 8 position dip switch. Switch 1 controls the 8-10K area, switch 2 controls 10-12K area, switch 3 controls the 12-14K area and switch 4 controls the 14-16K area. The "on" position represents inable and the off position represents disable. These switches are easily changed with a pencil point. If there is a plastic film covering the dip switches, remove it before operating the switches.

RAM *

0-8K ROM-RAM

The bottom rocker switch on the left of the UM-64 controls the ROM-RAM option. When the computer is first powered up, this switch must be in the "up" or ROM position to initialize the computer and get the K cursor. If you wish to use the ROM-RAM transfer function, enter the statement:

```
1 REM XXXXXXXXXXX          (11 X's)
```

Perform a POKE instruction for each location listed using the decimal data shown. (example: POKE 16518, 197) When the program is listed it will appear as the keystrokes shown corresponding to each program byte. Check this carefully.

BYTE NUMBER	LOCATION	Z80 MNEUMONIC	HEX DATA	DECIMAL DATA	T/S KEYSTROKES
1	16514	LD BC,2000	01	1	(GRAPHICS 1)
2	16515		00	0	-(SPACE)
3	16516		20	32	4
4	16517	DEC BC	0B	11	"
5	16518	PUSH BC	C5	197	VAL
6	16519	PUSH BC	C5	197	VAL
7	16520	POP HL	E1	225	LPRINT
8	16521	POP DE	D1	209	SGN
9	16522	LDDR	ED	237	GOSUB
10	16523		B8	184	S (INVERSE S)
11	16524	RET	C9	201	TAN

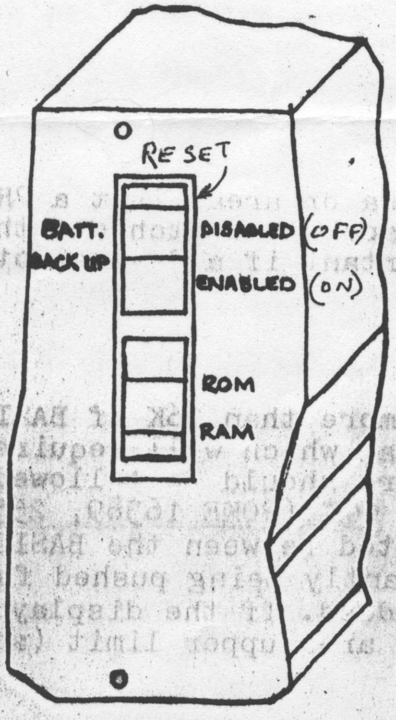
After the program is entered it may be executed by performing the command:

```
RAND USR 16514
```

The program execution time is less than 1 second. After the program has been entered correctly it can be SAVED for LOADing in the future. After the execution of this program, the ROM will have been loaded into the 0-8K area of RAM and the RAM may be modified by the appropriate poke functions. Remember, poking the 0-8K area will only change the RAM area and will not affect the ROM and therefore any peeking will not show the change in the 0-8K RAM area. To switch from the ROM operating system to the RAM operating system, move the bottom rocker switch into the down position. You are now in the RAM operating system and should be able to verify any of your "ROM" changes using peek statements. Switching the ROM-RAM rocker switch to the up position again will return you to the ROM operating system. Note, there is an error in the ROM. This means that you can't use the reset switch while in the RAM position.

BATTERY BACK UP-RESET

The top rocker switch is the battery back up-reset switch. The UM-64 may be operated with or without the batteries and the battery bracket may be enclosed in the case or left outside. Be sure that the insulator is between the PC Board and battery bracket before inserting the bracket into the case. On the factory assembled UM-64s, the battery bracket is inside the case. Remove the 2 screws on the right end of the case to gain access to it. Six size AA alkaline cells are required. When the top rocker switch is in the up position, the battery backup is NOT ENABLED and will not function when the power is interrupted. Note that to avoid using your battery backup when you turn off your computer, be sure that this switch is in the up position. To set your battery backup to the enable mode, move this switch to the down position. Your battery backup will now take over when you interrupt the power to your computer. Remember that you CANNOT turn off your computer with the battery backup-reset switch in this position. You will also notice that changing the position of this switch will perform a reset. This reset only affects the 16-32K area. Note: When you are debugging machine language programs, you can store another copy of the program above 32K or between 8K & 16K and then bring it back into the 16K to 32K area after you do a reset. Remember, do not pull the power plug out of your computer with the battery backup feature enabled. This will cause the batteries to short during the time the plug is half in and half out. To test the battery backup feature, pull the wall transformer out of the wall.



"Up position" Push in on the top of the rocker switch.

"Down position" Push in on the bottom of the rocker switch.

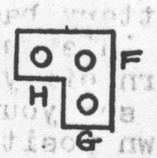
RUN PROGRAMS WRITTEN FOR 16K

With the BYTE-BACK UM-64 you can run any of your 16K programs in the normal way with no changes. To make full use of your additional memory be sure to use a mult-dimensional string array instead of a simple string, since the computer limits single string sizes to a maximum length of 16K.

USING PROMS

The UM-64 is shipped ready to accept an INTEL 2716-1, 2K, 300ns PROM. You can use slower INTEL 2716s by making the cut and adding the jumper shown. This will increase power consumption slightly. INTEL 2732, 4K parts can also be used by adding one cut and one jumper. Remember that Pin 1 of the PROM socket is in the upper right corner by capacitor C12.

PROM	TYPE	CUT AND JUMPER
2716-1	300 ns	None
2716	slower speed	cut J to K jumper J to ground (J1 pin 4B)
2732	any speed	cut F to G jumper F to L



NOTE: silk-
scree
may b
mis-
leading

Many other proms can be used. Consult the factory for technical assistance. Refer to the dip switch settings to select the location in memory of these PROMS. Note: Only 5v. PROMS can be used.

DIP SWITCH SETTINGS

RAM enabled if switches are closed (on)

8-10 K dip switch	1
10-12K	2
12-14K	3 OFF
* 14-16K	4 OFF

PROM enabled if switches are open (off)

8-10 K	5
10-12K	6
12-14K	7
14-16K	8

S/B (ON) IF NO PROM PLUGED-IN

Remember RAM must be dissabled in the area or areas that a PROM is being used. Note: If PROM is not in the socket, switches 5 through 8 should be closed. (on) This is only important if a device, other than the UM-64 is used in the 8-16K area.

PROGRAMING MORE THAN 16K OF BASIC

Most basic programs seldom require more than 16K of BASIC. If you feel that you are programing a program which will require more than 16K of BASIC, the following procedure should be followed. Be sure you have initialized the system for 64K (POKE 16389, 255 and NEW). The computers display file is located between the BASIC programing area and the variables area and is constantly being pushed further up. in memory as more BASIC statements are added. If the display file is ever forced to straddle the 16K BASIC area upper limit (address

*

32767) the computer will crash. To find where the upper limit of your display file is located, enter PRINT PEEK 16400 + 256 + PEEK 16401. Continue to add your basic statements and periodically check where the upper limit of the display file is. When it is located between 32000 and 32767, enter FAST mode and enter the following statement as one of your BASIC programing lines. Print 0+0+0+0+0 etc. continue entering "+0" until the entire screen (22 lines) is full. This BASIC statement will add about 2.9K of BASIC to your program and push the display fill well over address 32767. You can now continue with your BASIC programing as before. Once you have entered enough additional BASIC statements to equal the area occupied by your dummy print statement, you can delete the dummy statement.

SERVICE & WARRANTY

All BYTE-BACK modules carry a 90-day warranty. This includes kits. We will repair your UM-64 free during this period if you have any trouble with it. Naturally, in the case of kits, the warranty doesn't cover kits that have been assembled wrong. If your kit doesn't work, return it with $22 plus $3 shipping ($25 total) and we will repair it. If the problem is found to be defective parts supplied by us, we will refund the full service fee including the shipping charge. Please return units to be repaired:

BYTE-BACK CO.
~~Rt. # Box 147 Brodie~~ Rd. Rt 4 Box 54
Leesville, SC 29070

P.O. Box 112
120 Long Terrace

Please include a note with your name, address, phone number and a description of the problem. For questions and assistance you may call us at 803-532-5812.

w/sw 3 & 4 off * = 473
SEE * 3/24/86 A & J LETTER
WITH NO PROM IN SOCKET

SW 1 — ON
2 — ON
3 — OFF
4
5
6
7
8 OFF

C/B
5 TO 8 ON
IF NO PROM IN
SOCKET

⑥

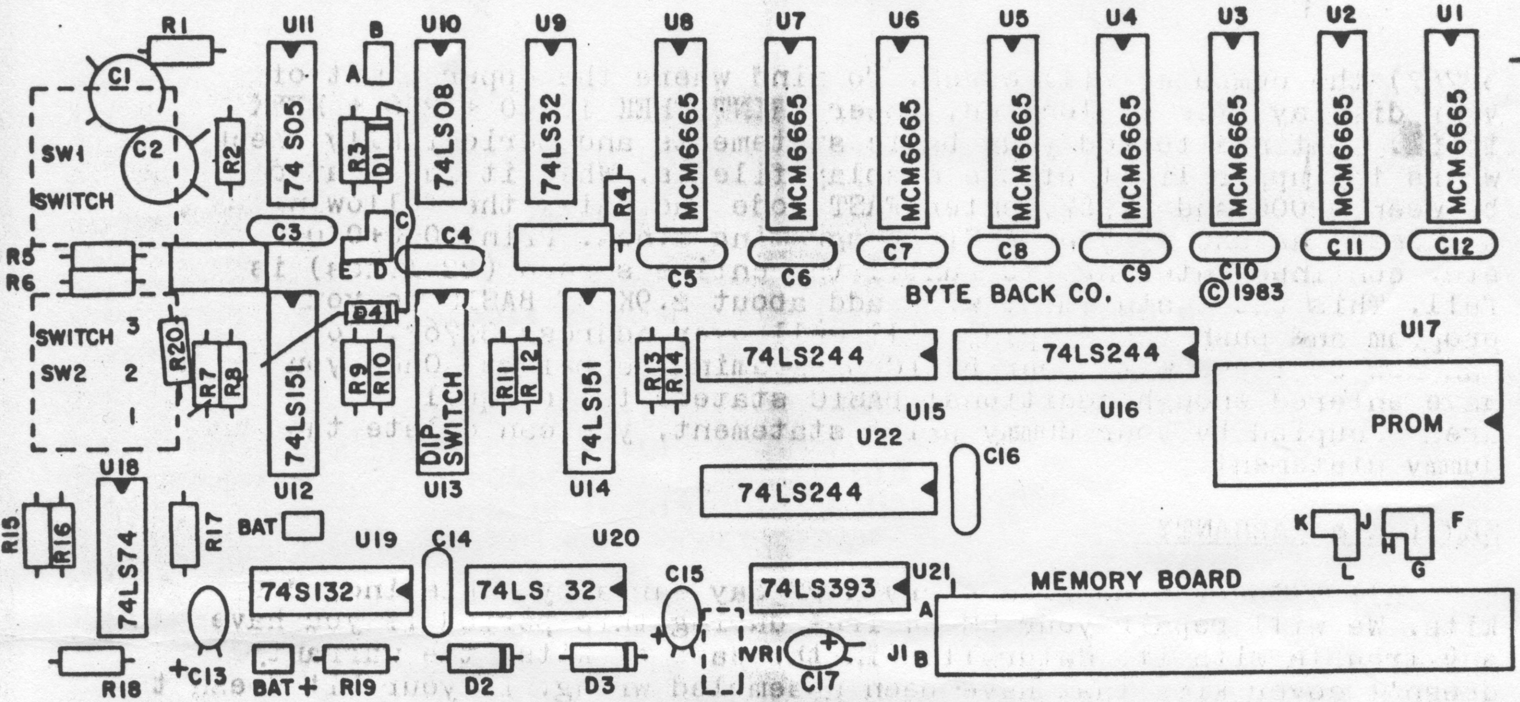


FIG.3

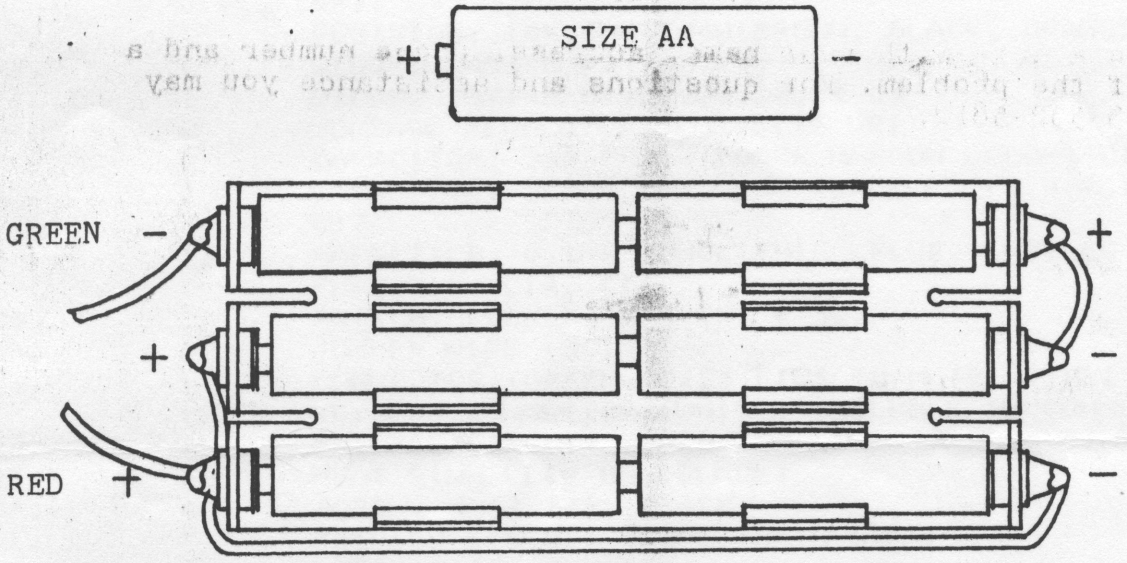


FIG.6

Note: Figures 1,2,4,5,7,&8 are included in kit manuals only.

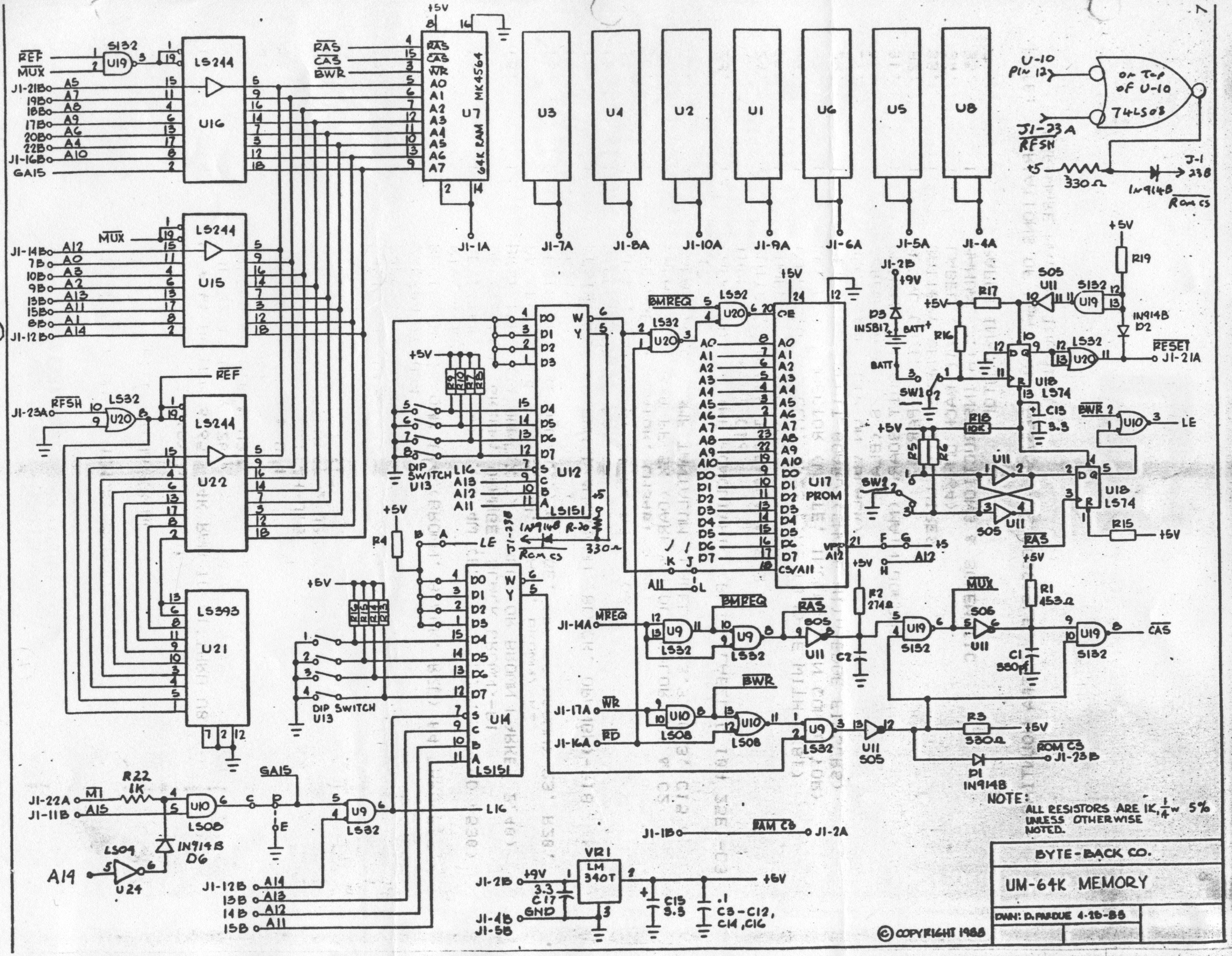
⑦

BYTE-BACK UM-64 MEMORY MODULE

BILL OF MATERIALS

ITEM#	QNTY	DESCRIPTION
1.	8	MK **4164** OR MCM 6665, 64K RAM IC-U1 THRU U8
2.	2	74LS32 IC-U9 & U20
3.	2	74LS08 IC-U10 & U23
4.	1	74S05 IC-U11
5.	2	74LS151 IC-U12 & U14
6.	1	8 POSITION DIP SWITCH-U13
7.	3	74LS244 IC-U15, U16, & U22
8.	1	24 PIN ROM SOCKET-U17
9.	1	74LS74 IC-U18
10.	1	74S132 IC-U19
11.	1	74LS393 IC-U21
12.	1	74LS04 IC-U24
13.	16	RESISTOR, 1K OHM 1/4W(BROWN, BLACK, RED)-R4 THRU R17, R19, & R22
14.	1	RESISTOR, 453 OHM 1% 1/4W (BLUE OR BROWN MARKED 4530) OR (YELLOW, GREEN, ORANGE, BLACK BROWN)-R1
15.	1	RESISTOR, 274 OHM 1% 1/4W(BLUE OR BROWN MARKED 2740) OR (RED, VIOLET, YELLOW, BLACK, BROWN)-R2
16.	3	RESISTOR, 330 OHM 1/4W(ORANGE, ORANGE,BROWN)-R3, R20, &R21
17.	1	RESISTOR, 10K OHM 1/4W(BROWN, BLACK, ORANGE)-R18
18.	1	DIODE, 1N5817-D3
19.	5	DIODE, 1N914B D1,D2,D4,D5, & D6
20.	1	VOLTAGE REGULATOR, LM340T-5 VR1
21.	2	CAPACITOR, 330 PF 5% (DARK MAROON COLOR)-C1 & C2
22.	3	CAPACITOR, 3.3MF TANTALUM (LABELED +3.3)-C13, C15 & C17
23.	12	CAPACITOR, 0.1MF MONOLITHIC (BLUE, LABELED 104 25E)-C3 THRU C12, C14, C16
24.	2	SWITCH, ROCKER TYPE-SW1 & SW2
25.	1	JUMPER WIRE (8 IN)
26.	1	CONNECTOR,(GREEN, 2x23 PINS TO MATE WITH ZX81)
27.	1	KEY FOR CONNECTOR (WHITE, INCLUDED IN CONNECTOR)
28.	1	PRINTED CIRCUIT BOARD (SMALL WITH EDGE FINGERS)
29.	1	HEAT SINK CLIP ON (BLACK)
30.	4	SCREW, 4-40x1/8 (BLACK)
31.	1	PRINTED CIRCUIT BOARD (MAIN BOARD)
32.	1	METAL CASE (4 PARTS)
33.	1	BATTERY BRACKET WITH WIRES
34.	1	LABEL (BYTE-BACK UM-64)
35.	1	MANUAL WITH INSTRUCTIONS & SCHEMATIC
36.	1	PAPER INSULATOR

NOTE: VARIATIONS OF HEAT SINK DESIGN ARE POSSIBLE. EXTRA MOUNTING HARDWARE MAY BE INCLUDED.



NOTE:
ALL RESISTORS ARE 1K, ¼W 5% UNLESS OTHERWISE NOTED.

BYTE-BACK CO.

UM-64K MEMORY

DWN: D. PARDUE 4-15-88

© COPYRIGHT 1988